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Vitamin-Like Coenzyme Q₁₀ Reduces Fatigue and Boosts Energy Levels

Coenzyme Q₁₀, a vitamin-like nutrient, can reduce physical fatigue and increase stamina – in both average people and trained athletes, according to the findings of two recent studies.

In the first study, Kei Mizuno, PhD, and his colleagues gave 17 healthy men and women 100 mg of coenzyme Q₁₀ (CoQ₁₀), 300 mg of CoQ₁₀, or placebos daily for eight days. The subjects had a median age of 37 years.

To induce fatigue, the subjects rode a stationary bicycle for two hours, then rested for four hours before the next round of exercise.

“We found that oral administration of 300 mg of coenzyme Q₁₀ for one week improved physical performance during fatigue-inducing workload trials on a bicycle...” wrote Mizuno and his colleagues. No benefits were found with either the 100 mg dose of CoQ₁₀ or the placebo.

The researchers reported that people taking 300 mg of CoQ₁₀ were able to cycle at faster speeds and also recovered more quickly after exercise.

In the second study, Matthew Cooke, PhD, of Baylor University, Waco, Texas, and his colleagues, gave 200 mg of CoQ₁₀ or placebos daily to 22 aerobically trained and 19 untrained men and women for two weeks.

The subjects engaged in four exercise sessions during the course of the study. After taking CoQ₁₀, the subjects showed greater resistance to exercise-related exhaustion, whereas the placebo group had an increased level of exhaustion after each round of exercise. The changes occurred in subjects who previously had been aerobically trained as well as those who had not trained.

Based on muscle biopsies of the subjects, the supplemental CoQ₁₀ was absorbed into muscle cells within two hours.

CoQ₁₀ plays an essential role in mitochondria, cell structures that break down food for energy. CoQ₁₀ levels are highest in organs with the greatest energy

requirements, including the heart, brain, liver, and kidneys. The 1978 Nobel prize in chemistry was based on research describing the role of CoQ₁₀ in cells. Other research has shown that supplemental CoQ₁₀ can be beneficial in heart failure.

References: Mizuno K, Tanaka M, Nozaki S, et al. Antifatigue effects of coenzyme Q₁₀ during physical fatigue. *Nutrition*, 2008; epub ahead of print. Cooke M, Iosia M, Buford T, et al. Effects of acute and 14-day coenzyme Q₁₀ supplementation on exercise performance in both trained and untrained individuals. *Journal of the International Society of Sports Nutrition*, 2008;5:doi: 10.1186/1550-2783-5-8. □

Perspectives Cholesterol Confusion

The makers of Zetia and Vytorin (which combines Zetia and Zocor) recently announced that their aggressively advertised cholesterol-lowering drugs failed to slow the development of fatty plaque in arteries – and might actually promote the formation of plaque. The announcement – in a news release, not a medical journal – came after long delays in reporting the findings of their study.

Why the delays? Quite simply, money. Sales of the two drugs added up to \$5 billion in revenues in 2007.

The news release was the first of several fascinating and bizarre reports on the drugs. Even though the drugs don't prevent heart disease, the American Heart Association quickly issued a news release in defense of the drugs.

If you're confused by that, just follow the money trail. According to an article in the *New York Times*, the American Heart Association gets \$2 million a year from Merck/Schering-Plough Pharmaceuticals, the pharmaceutical group that markets Vytorin.

The failure of this and other recent cholesterol-lowering drug trials renewed a long-simmering debate about the role of cholesterol in heart disease. Cholesterol is a *symptom* of heart disease, not a *cause*, and Vytorin and other drugs merely alter a

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symptom. In fact, cholesterol has long been known as only a weak indicator of heart disease risk (*American Journal of Epidemiology*, 1977;105:281-9). Half of the people who have heart attacks have normal cholesterol levels.

What then causes heart disease? The answer is a variety of factors, including prediabetes and overweight, which result from excess intake of refined sugars, processed sugar-like carbohydrates, and trans fats. This dietary pattern elevates blood sugar, insulin – and, yes, cholesterol.

If all this isn't strange enough, consider one more recent report. The average cholesterol level of Americans is now lower than it was back in 1960 because of all the cholesterol-lowering drugs that have been prescribed. At the same time, two-thirds of Americans are now overweight – the number one risk factor for diabetes and heart disease. In effect, Rome burns while medicine fiddles with cholesterol. – JC

Alpha-Lipoic Acid, A Potent Antioxidant, Protects the Heart

Alpha-lipoic acid, a popular antioxidant, may help prevent coronary heart disease, according to a recent animal study.

Wei-Jian Zhang, MD, PhD, and Balz Frei, PhD, along with their colleagues at the Linus Pauling Institute, at Oregon State University in Corvallis, investigated the effects of alpha-lipoic acid on vascular inflammation, fat deposits, and the formation of atherosclerotic lesions in two types of mice genetically predisposed to develop heart disease.

Atherosclerosis was once called “hardening of the arteries,” but heart disease is not recognized as the result of a chronic low-grade inflammatory process.

Zhang found that supplemental alpha-lipoic acid significantly reduced the formation of atherosclerotic lesions by about 40 to 50 percent in the arteries of the mice, with the difference related to the two different types of mice used in the study.

Alpha-lipoic acid supplementation also reduced the activity of inflammation-promoting compounds called cytokines and the activity of adhesion molecules, which also promote inflammation.

In addition, mice receiving alpha-lipoic acid gained almost 40 percent less weight, compared with animals not receiving the antioxidant.

The mice also had lower triglyceride levels, another risk factor for heart disease. Zhang noted that the triglyceride-lowering effect of alpha-lipoic acid could be related to several factors, including reduced food consumption, increased breakdown of food by enzymes that depend on alpha-lipoic acid.

He estimated that the human equivalent of alpha-lipoic acid used in the study was about 2,000 mg daily, which is far above the 50 to 600 mg amount typically taken as a supplement.

Reference: Zhang WJ, Bird KE, McMillen TS, et al. Dietary alpha-lipoic acid supplementation inhibits athero-sclerotic lesion development in apolipoprotein E-deficient and apolipoprotein E/low-density lipoprotein receptor-deficient mice. *Circulation*, 2008;117:421-428. □

Analysis Confirms Benefits of Hawthorn in Heart Failure

The use of hawthorn extract, a traditional herbal remedy for heart failure, received a noteworthy scientific blessing, after an analysis of 10 placebo-controlled studies.

Max Pittler, MD, deputy director of complementary medicine at the Peninsula Medical School, Exeter, England, and his colleagues analyzed data that included 855 patients with moderate to severe heart failure (known more formally as New York Heart Association heart failure classes I to III).

Pittler reported that hawthorn extract was significantly better than placebo when it came to increasing exercise tolerance, reducing oxygen requirements by the heart, and reducing shortness of breath. In essence, the herb improved the ability of people with heart failure to work and to walk.

Reference: Pittler M, Guo R, Ernst E. Hawthorn extract for treating chronic heart failure. *Cochrane Database of Systematic Reviews*, 2008:CD005312. □

Green Tea Extract Helps Burn Fat and Improve Glucose Tolerance

Taking standardized extracts of green tea in capsules can increase fat burning and improve glucose tolerance when combined with moderate exercise, according to a study published by British researchers.

In the first of two experiments, researcher Asker J. Jeukendrup, PhD, of the University of Birmingham, England, and his colleagues asked 11 healthy men to work out on a stationary bicycle with moderate intensity for 30 minutes before and after taking 3 capsules containing either green tea extract or a placebo. In the second experiment, the men underwent a glucose-tolerance test before and after taking the capsules.

Three capsules of the green tea extract provided 340 mg of antioxidant polyphenols and 136 mg of epigallocatechin gallate, a type of antioxidant polyphenol. This amount of green tea extract is equivalent to about 3.5 cups of green tea.

Jeukendrup found that fat burning – technically

known as fat oxidation – was 17 percent higher after taking the green tea extract, compared with the placebo. In addition, the green tea encouraged greater burning of fat as a source of energy.

After the glucose-tolerance test, Jeukendrup noted a 15 percent decrease in insulin, which he wrote converted to a 13 percent increase in insulin sensitivity. Greater insulin sensitivity, which is better for health, reflects a more efficient use of insulin.

The researchers speculated that the increase in insulin sensitivity and glucose tolerance may be related to more burning, rather than storage, of fat.

Reference: Venables MC, Hulston CJ, Cox HR, et al. Green tea extract ingestion, fat oxidation, and glucose tolerance in healthy humans. *American Journal of Clinical Nutrition*, 2008;87:778-784. □

Oral Hyaluronic Acid May Help in Mild Cases of Knee Osteoarthritis

Injections of hyaluronic acid, a compound found in knee joints, are sometimes used to treat osteoarthritis. But until now, there have been doubts about whether oral forms have any benefits.

Douglas S. Kalman, PhD, and his colleagues at Miami Research Associates, South Miami, Florida, treated 20 people with either 80 mg of hyaluronic acid supplements or placebos daily for eight weeks. All of the subjects had pain from knee osteoarthritis for at least 15 days in the previous month.

The hyaluronic acid was extracted from chicken combs – that is, the reddish crown of the birds.

Both groups of patients reported less pain by the end of the study, but those taking the hyaluronic acid supplements reported significantly less pain and better function.

Reference: Kalman DS, Heimer M, Valdon, et al. Effect of a natural extract of chicken combs with a high content of hyaluronic acid (Hyal-Joint®) on pain relief and quality of life in subjects with knee osteoarthritis: a pilot randomized double-blind placebo-controlled trial. *Nutrition Journal*, 2008;7:doi:10.1186/1475-2891-7-3. □

Antioxidants Ease Pain in People with Rheumatoid Arthritis

A combination of antioxidants, contained in a margarine-like spread, significantly reduced pain from rheumatoid arthritis, according to a study conducted in The Netherlands.

Richard M. van Vugt, MD, of Vrije University Medical Center, Amsterdam, asked eight women with active rheumatoid arthritis to use 20 grams of the antioxidant spread daily for 10 weeks. The spread contained 400 mg of vitamin E, 10 mg of lycopene, 5 mg of carotenoids (mostly alpha-carotene), and

10 mg of lutein. In addition, the subjects took a separate supplement of 200 mg of vitamin C daily.

Seven of the eight patients improved with significant reductions in pain. The average reduction in pain, including the eighth patient (for statistical reasons), was about 27 percent.

The authors wrote that “the number of swollen and painful joints were significantly decreased and general health significantly increased...”

After four weeks of not using the antioxidant spread, symptoms of rheumatoid arthritis began to return.

Reference: van Vugt RM, Rijken PJ, Rietveld AG, et al. Antioxidant intervention in rheumatoid arthritis: results of an open pilot study. *Clinical Rheumatology*, 2008; epub ahead of print. □

Low Vitamin D Levels May Increase Risk of Heart Attack

Low blood levels of vitamin D are strongly associated with a variety of heart and cardiovascular problems, according to a new study. Previous research has found that low levels of vitamin D increase the risk of osteoporosis, cancer, and multiple sclerosis.

Thomas J. Wang, MD, of Massachusetts General Hospital, and his colleagues, studied 1,739 people participating in the Framingham Offspring Study. The men and women in the study had an average age of 59, and all were free of cardiovascular disease when the study began. Over about five and a half years, 120 of the subjects suffered their first “cardiovascular event.”

Overall, 28 percent of the subjects were deficient in vitamin D, with blood levels less than 15 ng/ml. People with the lowest levels of vitamin D were 62 percent more likely to experience a heart attack, heart failure, or stroke. In addition, people with low vitamin D levels were twice as likely to have high blood pressure, compared with people who had the highest levels of the vitamin.

Reference: Wang TJ, Pencina MJ, Booth SL, et al. Vitamin D deficiency and risk of cardiovascular disease. *Circulation*, 2008;117:503-511. □

Vitamins E and C Help in Sudden, Unexplained Hearing Loss

The sudden and unexplained loss of hearing may affect between 30,000 and 60,000 Americans, but a new study suggests that vitamin supplements may promote a quick recovery.

Makoto Ito, MD, of the Kanazawa University Graduate School of Medical Science, Japan, and his

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Quick Reviews of Recent Research

• Vitamin D Deficiency Common in Arizona

Southern Arizona has around 300 sunny days each year – ample opportunity for people to make their own vitamin D. But researchers at the University of Arizona, Tucson, have found vitamin D deficiency surprisingly common. In a study of 619 people, they found that one-fourth overall were deficient in vitamin D – less than 20 ng/ml of blood. Hispanics and Blacks fared far worse than whites. Almost 38 percent of Hispanics were deficient, as were almost 56 percent of Blacks, compared with about 23 percent of whites.

Jacobs ET, et al. *American Journal of Clinical Nutrition*, 2008;87:608-613.

• Alpha-lipoic acid slows Alzheimer's disease

Researchers at James Cook University, Australia, used 600 mg of alpha-lipoic acid daily to treat 43 patients with Alzheimer's disease. After four years, patients with mild Alzheimer's disease deteriorated "extremely slowly," based on their responses to two cognitive tests. The progression of Alzheimer's disease was less than that found in either untreated patients or those taking cholinesterase-inhibitor drugs, according to the researchers.

Hager K, et al. *Journal of Neurotransmission – Supplement*, 2007;72:189-193.

• Choline may reduce inflammation

In a study of 3,042 men and women, researchers from the University of Athens, Greece, found that people consuming the most choline (a B vitamin) and betaine (a vitamin-like nutrient) had the lowest levels

of blood markers of inflammation.

Detopoulou P, et al. *American Journal of Clinical Nutrition*, 2008;87:424-430.

• Fish oils good for blood vessel tone

One of the hallmarks of a healthy cardiovascular system is blood vessels that flex, or dilate. Researchers from China treated 52 people who were overweight and also had high blood pressure. Twenty-six of the subjects took 3 grams of omega-3 fish oils daily for eight weeks, and 26 took placebos. Arterial elasticity improved in the people taking fish oils, but not in the placebo group.

Wang S, et al. *European Journal of Clinical Nutrition*, 2007: epub ahead of print.

• Magnesium may reduce gallstone risk

Researchers from the University of Kentucky, Lexington, tracked 42,705 middle-age and elderly men for 16 years. People with the highest magnesium intake from diet or supplements had a 33 percent lower risk of developing gallstones, compared with men who consumed the least magnesium. Lack of magnesium is known to decrease the "good" HDL form of cholesterol and raise triglyceride levels, both of which are also associated with gallstones.

Tsai CJ, et al. *American Journal of Gastroenterology*, 2008;103:375-382.

• Herb may help control blood sugar

An extract of ivy gourd (*Coccinia indicia*), long used in the Ayurvedic medical traditions of southern Asia, may be helpful in controlling blood sugar. Researchers from Bangalore, India asked 60 middle-age people with type 2 diabetes to take an extract of ivy gourd daily for 90 days. By the end of the study, fasting blood sugar decreased by 16 percent and postprandial blood sugar went down by 18 percent.

Kuriyan R, et al. *Diabetes Care*, 2008;31:216-220.

Vitamins and Hearing Loss...

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colleagues treated a total of 87 patients within 14 days of their hearing loss. Forty-nine of the patients received 400 IU of vitamin E and 1,200 mg of vitamin C daily for at least four weeks. A control group of 38 people did not receive any vitamins.

Of the people taking vitamins, 63 percent improved, compared with only 44 percent in the control group. In addition, people taking the vitamins had almost a 30 decibel improvement in hearing, compared with only an 18.5 decibel improvement in the control group.

"Complete recovery was achieved in 18 patients (36.7%) in the vitamin E and C group and in only 4 patients (10.5%) in the control group," wrote Ito and his colleagues.

Reference: Hatano M, Uramoto N, Okabe Y, et al. Vitamin E and vitamin C in the treatment of idiopathic sudden sensorineural hearing loss. *Acta Oto-Laryngologica*, 2008;128:116-121. □

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